

**Goitre Coed Fach Farm, Goitre Coed Road, TREHARRIS, CF46 5BB**

**Agricultural Barn**

**Structural Inspection Report**

## **Steve Morgan Associates**

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Signed

A handwritten signature in black ink, appearing to read 'Ashley Rogers', written over a light grey rectangular background.

**Ashley Rogers**

**B.Eng. (Tech)., C.Eng., F.I.**

**Struct.E**

## 1.0 INTRODUCTION

Steve Morgan Associates Ltd was appointed by Geraint John Planning Ltd, on behalf of the owner of the above, to carry out a structural inspection of an agricultural barn at Goitre Coed Fach Farm, Treharris, CF45 5BB to determine the suitability for conversion to a dwelling. An initial inspection was carried out during the morning of Tuesday 7<sup>th</sup> December 2021 by Ashley Rogers of Steve Morgan Associates Ltd. The weather on the day of the inspection was overcast with heavy winds and rain at the onset of Storm Bara. A subsequent visit was made by Steve Morgan on Friday 11<sup>th</sup> March following queries raised by the planning officer.

No excavations or opening up of concealed areas were carried out during the inspections but will be recommended if considered necessary. No inspection of electrical or plumbing installations has been carried out within the scope of this report. The survey also excludes any inspection relating to timber rot/infestation or the presence of asbestos based products.

The building is generally a single storey; stone built structure with a duo-pitched roof lying on a north-west to south-east axis to the north of Goitre Coed Road, with a light-weight store attached at the west corner and a, lower, cattle barn extending to the north-east and attached to the main barn along part of its north-east elevation. The whole is built in ground that falls from the north-west to south-east and has floor levels that step internally in sympathy with the outside ground levels. Along the outside of the north-west gable there is, what appears to be, stone rubble from a previous construction stacked against the wall. To the south-east there is a more modern agricultural building that screens the majority of that gable wall of the stone barn. Internally the main barn is not subdivided into separate rooms. Note: we have been provided with drawings prepared by OAD Studio and for simplicity they have used an orientation of north to south, to be consistent references to the drawings and photographs will retain these references.

The roof to the main structure is a more recent replacement consisting of gang-nailed trusses and finished in corrugated metal sheets.

**2.0     DETAILS OF INSPECTION:** Refer also to the attached photographs and abstracts from drawings.

**2.1     Stone Barn – West Elevation:**

There are several existing doors and windows in this elevation that are framed in brickwork and have timber lintels that support the wall and / or roof over depending on the location. There are other, infilled openings, towards the south end, and a crack towards the upper section of the wall adjacent to the corner; this is possibly associated with the former openings and there is a straight, un-bonded joint internally at the corner.

**2.2     Stone Barn – North Elevation:**

This elevation is a gable wall at the higher level and is partially concealed externally by stone rubble along the lower level. There is some banding of a paler coloured stone that maybe associated with a previous structure. Internally the wall shows evidence of a possible redundant fireplace. There is an existing opening at first floor level on the north elevation which has been blocked up. The bonding to the side walls appears to be in the form of intermittent tie stones as opposed to continuous bonding along the full height.

**2.3     Stone Barn – East Elevation:**

There are two openings in this elevation, an original brick framed window and a modern door that appears to have been set into an existing opening that has been modified and as a result the upper section of stone either side has “run” back away from the frame. Internally the wall is undisturbed apart from the door and window.

**2.4     Stone Barn – South Elevation:**

Externally this gable could only be viewed obliquely as a result of the proximity of the steel structure; the general plane of the wall appears good, but the south-west corner seems to form a slight buttress and this section of wall may have once continued along, what is now, the line of the newer barn. There is evidence of a former doorway towards the west end, and this is boarded over internally.

## **2.5    Cattle Barn:**

This is built against the north-east side of the stone barn and is enclosed along the north-west and north-east by stonework that has been extended upwards by blockwork. The fourth, south-east, side is formed in single skin blockwork both sides of a large opening. The roof is formed in profiled metal sheets on a basic system of rafters and purlins. The rear and side walls of the cattle barn are of random masonry which is in good condition and suitable for conversion. The walls were observed from both within the courtyard and to the rear of the cattle barn. Structurally, there is no requirement for any demolition of the walls as part of the conversion.

### **3.0 CONCLUSIONS AND RECOMMENDATIONS INCLUDING REFERENCE TO THE PROPOSALS:**

The following items were considered as requiring further consideration: -

- (i) The design of the main, pitched roof and the flat roof over the annexe will need to be considered with respect to the materials to be used, the form of the roof and the available supporting structure.
- (ii) The barn will require a new floor slab with the necessary insulation to adjust the floor levels and comply with current regulations. The fill below the ground floor slab has been removed and the slab level is now as the original. It has been established that the lower ground floor level will not compromise the existing lower level foundations. Suitable tanking may be required where internal levels are below external ground levels.
- (iii) The existing walls do not appear to meet the required 'U' values. Any additional wall or improved insulation characteristics of the existing wall should consider the extent of the existing foundations. It is anticipated that the existing foundations will not be wide enough to accommodate an additional blockwork skin but will need to be investigated. The wall that is to the south side of the existing cattle barn is shown on the proposals as being largely clad; the section of retained wall is to be overclad in profiled sheeting that can incorporate insulation to current standards.
- (iv) All existing timber lintels will need to be checked by a specialist and treated or replaced as found necessary. Consideration will need to be given to additional or redistributed loads in checking the existing lintels and it may be found necessary to introduce additional members to reduce loads on any retained members.

**CONCLUSIONS AND RECOMMENDATIONS INCLUDING REFERENCE TO THE PROPOSALS (Continued):**

- (v) There are a number of areas of existing infill that have straight joints that are not adequately bonded to the walls at the side, this also applies at corners. It is important that walls have structural continuity, and this can be achieved by cutting out and re-bonding or introducing mechanical or resin ties across the joints. Where walls are to be exposed, the former proposal is most applicable whilst at corners where two walls meet, a form of tie bars would be preferred. With regard to the full extent of the repairs, it is considered that, as a worst case, all corners should be considered for potential remedial works either by tying in or bonding. The works will be of no detriment to the aesthetics of the property and, where bonding of the masonry is utilised, will have beneficial aesthetic affect.
- (vi) The external walls to the cattle barn are of a combination of random masonry originally with well-constructed blockwork added above. The construction is considered substantial and adequate for the loading proposed from the new development. No defects were noted to either the random masonry or the blockwork. In terms of structural capacity, there is no requirement for any strengthening of the wall to support the proposed loads. On this basis, it is considered that the cattle barn is structurally adequate for conversion.
- (vii) Substantial rebuild of the barn is not required however, there will be an element of the structure that will require minor investigation prior to repointing.
- (viii) Foundations are below the new formation level at ground floor. The existing floor level was a product of imported fill as part of the implementation of a previous consent and its removal does not compromise the structural integrity of the barn. If required, further excavation can be undertaken to expose the foundations for the purposes of the planning application though not necessary for the structural conclusions.
- (ix) A timber wallplate is to be fixed to the perimeter of the building to accommodate the new first floor structure. This wallplate/ring beam will have the effect of strengthening the external walls and providing additional lateral restraint by fixing the first floor to the external walls.

**CONCLUSIONS AND RECOMMENDATIONS INCLUDING REFERENCE TO THE PROPOSALS (Continued):**

- (x) It is noted that the proposed first floor level is below the eaves of the roof. This can result in thrust at the base of the roof structure at eaves level. The floor should be designed as a diaphragm with timber joists fixed to the perimeter of the barn. The floor finish should include a minimum 12mm ply glued and screwed to the timber joists with the ply sections staggered. This will create the diaphragm which will ensure lateral stability of the walls and resist any thrust from the roof structure.

In addition, the following should be considered during the redevelopment of the property: -

(a) Excavations close to the external walls should be supervised by a suitably qualified Engineer. All new walls, including internal walls will need to be built off suitable foundations based on site conditions. The form and depth of the "foundations" to the existing, retained, walls should be investigated to determine their suitability to accommodate the proposed alterations.

(b) Excavations should not be continuous at a lower level than the existing wall as this will affect the stability of the wall.

(c) Any excavations that are carried out for investigations, drainage, incoming and outgoing services must be carried out with due regard to the existing structure. With respect to service trenches, these should be formed at right angles to the walls. Levels of new foundations and floor levels are also to be considered with respect to any existing foundation levels.

(d) The level of the base of the wall should be established prior to commencement of the works.

(e) External ground levels should be maintained as far as practically possible and as near to the original ground levels as possible to avoid destabilising the external walls. Where necessary internal tanking may be required. Where ground levels are reduced significantly, there is the potential for the walls to become retaining walls for which they were not originally intended. Any change in ground level externally should be kept to within 450mm. This reduction will not have a detrimental effect on the perimeter wall.

**CONCLUSIONS AND RECOMMENDATIONS INCLUDING REFERENCE TO THE PROPOSALS (Continued):**

(f) Rainwater should be discharged positively away from the building to prevent the risk of undermining of the existing foundation. If soakaways are to be used, these should be located at least 5m from the building and at a lower level than the foundations to the building.

(g) All growth adjacent to, and within, the walls is to be removed and roots killed off. Roots are not to be grubbed up or removed, whilst live, from walls to avoid disturbance to foundations and wall structure.

(h) Internally and externally, the stonework will require careful raking out and re-pointing. There are a number of areas that will require more intensive work. Areas may require to be re-built with stones tied across the cracks or bonding by the insertion of specialist sock anchor ties from the outside – refer to photographs. These areas are limited to not in excess of 4m<sup>2</sup> per elevation to allow for-

- loose stonework at eaves level
- to the perimeter of existing structural openings.
- Areas above defective lintels
- Areas where straight joints occur

Subject to the above, it is considered that the property is suitable for conversion.

**4.0      RELEVANT DRAWINGS:**

5.0 ANNOTATED PHOTOGRAPHS:



EAST ELEVATION: NOTE BRICK SURROUND TO OPENINGS AND  
INFILLED OPENINGS AT SOUTH END:



EAST ELEVATION / SOUTH END: NOTE INFILLED OPENINGS AND CRACK IN UPPER  
SECTION – SIDES OF OPENING TO BE BONDED TO INFILL AND CRACK TO BE  
REPAIRED BY INTRODUCING STONES BETWEEN WALL EACH SIDE:



EAST ELEVATION / SOUTH END: NOTE INFILLED OPENINGS WITH STRAIGHT JOINT  
– SIDES OF OPENING TO BE BONDED TO INFILL:



**EAST ELEVATION INTERNAL: NOTE INFILLED OPENINGS WITH STRAIGHT JOINT AND STRAIGHT JOINT AT CORNER – SIDES OF OPENING TO BE BONDED TO INFILL AND CORNER MECHANICALLY TIED USING RESIN / SOCK ANCHORS:**



**NORTH ELEVATION: NOTE RUBBLE AGAINST WALL AND PALER BAND OF STONE – STRUCTURE AT CORNER TO BE REMOVED:**



**NORTH ELEVATION INTERNAL: NOTE POSSIBLE FIREPLACE WITH STRAIGHT JOINT AT CORNER - CORNER MECHANICALLY TIED USING RESIN / SOCK ANCHORS:**



**PART OF EAST ELEVATION WITH LOWER (CATTLE) BARN:**



**PART OF EAST ELEVATION: NOTE WALL TO SIDES OF DOOR – DOOR JAMBS TO BE REBUILT AND BONDED INTO EXISTING:**



**EAST ELEVATION - INTERNAL: NOTE WALL TO SIDES OF DOOR AND LEVEL DIFFERENCES – DOOR JAMBS TO BE REBUILT AND BONDED INTO EXISTING:**



**VIEW ALONG SOUTH ELEVATION: NOTE POSSIBLE  
FORMER WALL EXTENSION AT CORNER:**



**VIEW ALONG SOUTH ELEVATION: NOTE OPENING AT WEST SIDE – SECTION BOARDED  
OFF INSIDE – OPENING TO BE MADE NARROWER AND NEW WINDOW INSERTED,  
REBUILD JAMB TO ONE SIDE BONDED NEW TO EXISTING:**



**SOUTH ELEVATION INTERNAL: NOTE BOARDED OVER OPENING AND WITH STRAIGHT  
JOINTS AT CORNERS– OPENING TO BE MADE NARROWER AND NEW WINDOW**

**INSERTED, REBUILD JAMB TO ONE SIDE BONDED NEW TO EXISTING – STRAIGHT  
JOINTED TO BE MECHANICALLY TIED:**



**SOUTH ELEVATION INTERNAL - DETAILS: NOTE BOARDED OVER OPENING AND WITH  
STRAIGHT JOINTS AT CORNERS – REFER TO NOTES ABOVE RE WINDOW AND JOINTS:**



**LOW LEVEL (CATTLE) BARN – BLOCK WALL TO BE REPLACED GLAZING FOR THE MOST  
PART AND WHERE RETAINED OVERCLAD WITH INSULATED CLADDING:**

**6.0    ANNOTATED ELEVATIONS SHOWING INDICATIVE MASONRY REPAIR**  
**LOCATIONS:**

